FLH Standard Criteria Files

Section 4 –

Roadway Shoulder Criteria Files

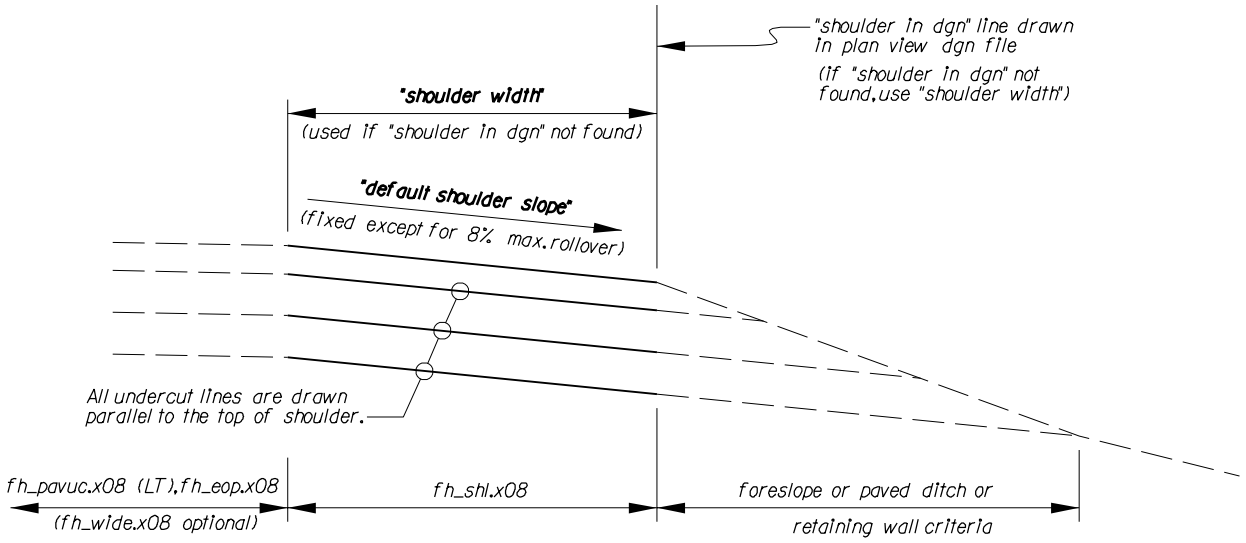
Roadway Shoulder Criteria Files

Criteria File	Rules for Drawing Shoulder
fh_sh1.x08	Shoulder slope is fixed (except for 8% maximum rollover from travel lane to shoulder). Shoulder width set by a line drawn in plan view dgn file. If line representing shoulder width isn't found in plan view dgn, then use default shoulder width. Undercut layers parallel to shoulder finish grade.
fh_sh2.x08	Shoulder slope is fixed (except for 8% maximum rollover from travel lane to shoulder). Shoulder width set by a line drawn in plan view dgn file. If line representing shoulder width isn't found in plan view dgn, then use default shoulder width. Undercut layers parallel to travel lane slope (rather than shoulder slope).
fh_sh3.x08	Shoulder slope is always the same as the travel lane slope. Shoulder width set by a line drawn in plan view dgn file. If line representing shoulder width isn't found in plan view dgn, then use default shoulder width. Undercut layers parallel to shoulder finish grade.
fh_sh4.x08	Shoulder slope is fixed (8% maximum rollover not checked). Shoulder width set by a line drawn in plan view dgn file. If line representing shoulder width isn't found in plan view dgn, then use default shoulder width. Undercut layers parallel to travel lane slope (rather than shoulder slope).
c_sh5.x08	Copy of fh_sh3.x08 with revised blue top point location. Shoulder slope is always the same as the travel lane slope. Shoulder width set by a line drawn in plan view dgn file. If line representing shoulder width isn't found in plan view dgn, then use default shoulder width. Undercut layers parallel to shoulder finish grade.
fh_sh6.x08	Copy of fh_sh3.x08 revised so that if a "guardrail in dgn" line is found then the pavement layer is terminated at the guardrail. Otherwise pavement layer daylights to foreslope. Shoulder slope is always the same as the travel lane slope. Shoulder width set by a line drawn in plan view dgn file. If line representing shoulder width isn't found in plan view dgn, then use default shoulder width. Undercut layers parallel to shoulder finish grade.

fh_sh1.x08

Draws roadway shoulder with the following properties:

- shoulder slope is fixed (except as noted in next item)
- shoulder slope will be adjusted as required to maintain a maximum rollover of 8% from the travel lane to the shoulder
- width of shoulder varies to match a line drawn in plan view dgn file representing the outside of the shoulder
- if the shoulder line in plan view dgn file isn't found, then the width of the shoulder defaults to a fixed value
- slope of shoulder undercut layers parallel to shoulder finish grade slope



define variables that must be assigned values in the input data file:

"shoulder width"
"default shoulder slope" (e.g., 10 = 10% down and away from centerline)
"first full length layer"

define_dgn variables that must be assigned values in the input data file:

"shoulder in dgn"

Variables that must be defined in exceptions data file:

None

Notes for fh_sh1.x08:

1. The slope of the shoulder is fixed except for the case when the rollover from the travel lane to the shoulder in greater than 8%. In that case, the slope of shoulder is adjusted to maintain an 8% rollover from the travel way.

Notes for fh_sh1.x08 (continued):

2. If the "shoulder in dgn" line is found in the plan view dgn file, then widen the shoulder to that line. If "shoulder in dgn" isn't found, then the "shoulder width" is used as the default shoulder width.

3. All the pavement and base course undercut layers are drawn parallel to the finish grade of the shoulder. (Contrast this fh_sh2.x08 which draws undercut layers parallel to the finish grade of the travel lane rather than the finish grade of the shoulder.)

4. The "first full length layer" variable controls whether the shoulder is a paved shoulder ("first full length layer" = 1) or a gravel shoulder ("first full length layer" = 2 or more).

5. To use this criteria file to add shoulder to the roadway cross-section only in specific station ranges, set "shoulder width" to 0 and draw "shoulder in dgn" only in the areas where shoulder is wanted.

6. By default, a slope label is placed for the shoulder. If the slope label isn't needed, add a *define "~place shoulder slope labels" 0* statement to the input file to turn them off.

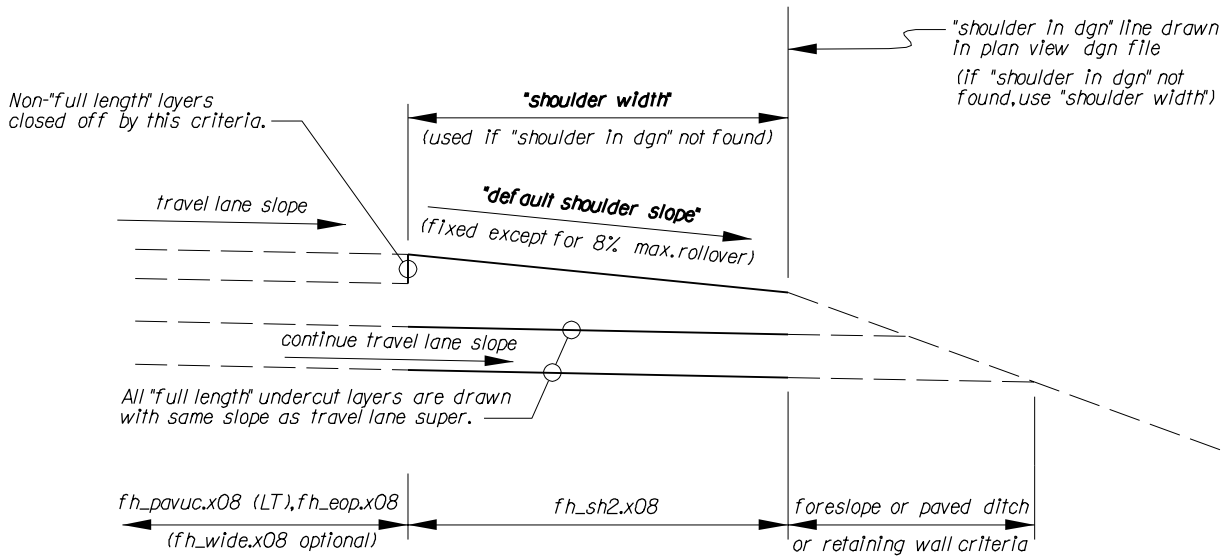
7. Text size for the shoulder slope label may be set with by adding a *define "text size" nnn* (where *nnn* is the desired text size) statement to the input file. By default the text size is set to 0.30. (The "text size" value applies to the slope labels created by all the criteria files.)

8. This criteria file is optional.

fh_sh2.x08

Draws roadway shoulder with the following properties:

- shoulder slope is fixed (except as noted in next item)
- shoulder slope will be adjusted as required to maintain a maximum rollover of 8% from the travel lane to the shoulder
- width of shoulder varies to match a line drawn in plan view dgn file representing the outside of the shoulder
- if the shoulder line in plan view dgn file isn't found, then the width of the shoulder defaults to a fixed value
- slope of shoulder undercut layers parallel to travel lane slope (rather than parallel to shoulder finish grade slope)



define variables that must be assigned values in the input data file:

"shoulder width"
"default shoulder slope" (e.g., 10 = 10% down and away from centerline)
"first full length layer"

define_dgn variables that must be assigned values in the input data file:

"shoulder in dgn"

Variables that must be defined in exceptions data file:

None

Notes for fh_sh2.x08:

1. The slope of the shoulder is fixed except for the case when the rollover from the travel lane to the shoulder in greater than 8%. In that case, the slope of shoulder is adjusted to maintain an 8% rollover from the travel way.

Notes for fh_sh2.x08 (continued):

2. If the "shoulder in dgn" line is found in the plan view dgn file, then widen the shoulder to that line. If "shoulder in dgn" isn't found, then the "shoulder width" is used as the default shoulder width.

3. All the pavement and base course undercut layers are drawn parallel to the travel lane slope (rather than parallel to the top of shoulder finish grade).

4. The "first full length layer" variable controls whether the shoulder is a paved shoulder ("first full length layer" = 1) or a gravel shoulder ("first full length layer" = 2 or more). Normally this criteria would be used for a gravel shoulder ("first full length layer" = 2).

5. To use this criteria file to add shoulder to the roadway cross-section only in specific station ranges, set "shoulder width" to 0 and draw "shoulder in dgn" only in the areas where shoulder is wanted.

6. By default, a slope label is placed for the shoulder. If the slope label isn't needed, add a *define "~place shoulder slope labels" 0* statement to the input file to turn them off.

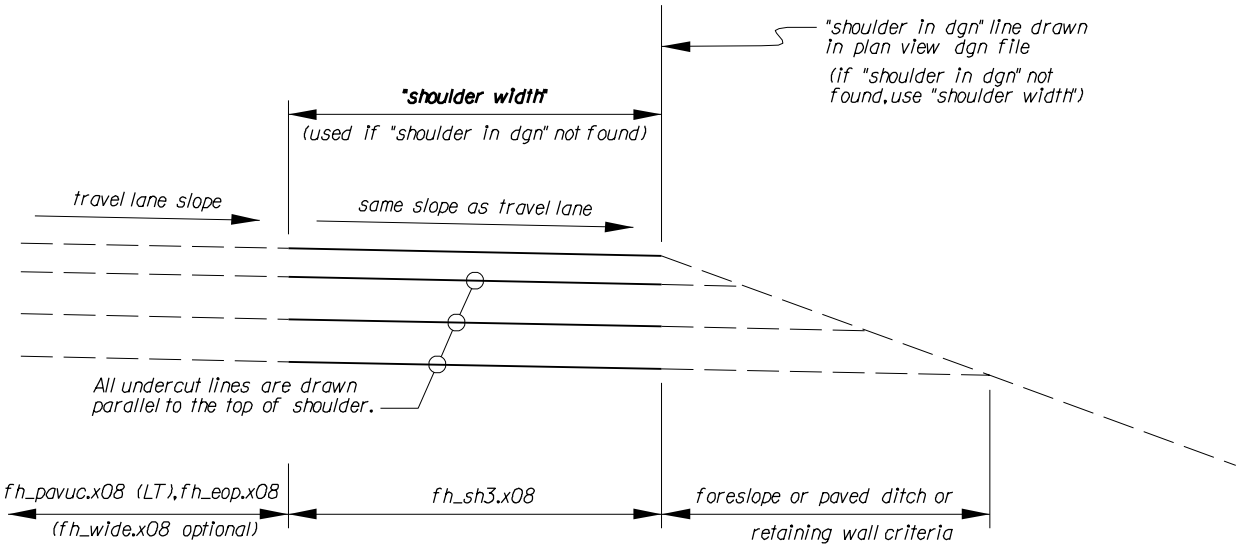
7. Text size for the shoulder slope label may be set with by adding a *define "text size" nnn* (where *nnn* is the desired text size) statement to the input file. By default the text size is set to 0.30. (The "text size" value applies to the slope labels created by all the criteria files.)

8. This criteria file is optional.

fh_sh3.x08

Draws roadway shoulder with the following properties:

- shoulder slope is always the same as the travel lane slope
- width of shoulder varies to match a line drawn in plan view dgn file representing the outside of the shoulder
- if the shoulder line in plan view dgn file isn't found, then the width of the shoulder defaults to a fixed value
- slope of shoulder undercut layers parallel to shoulder finish grade slope (and travel lane slope)



define variables that must be assigned values in the input data file:

"shoulder width"
"first full length layer"

define_dgn variables that must be assigned values in the input data file:

"shoulder in dgn"

Variables that must be defined in exceptions data file:

None

Notes for fh_sh3.x08:

1. The slope of the shoulder is always the same as the travel lane slope.

2. If the "shoulder in dgn" line is found in the plan view dgn file, then widen the shoulder to that line. If "shoulder in dgn" isn't found, then the "shoulder width" is used as the default shoulder width.

3. All the pavement and base course undercut layers are drawn parallel to the shoulder finish grade slope (and the travel lane slope).

Notes for fh_sh3.x08 (continued):

4. The "first full length layer" controls whether the shoulder is a paved shoulder ("first full length layer" = 1) or a gravel shoulder ("first full length layer" = 2 or more).

5. To use this criteria file to add shoulder to the roadway cross-section only in specific station ranges, set "shoulder width" to 0 and draw "shoulder in dgn" only in the areas where shoulder is wanted.

6. This criteria effectively does the same thing as fh_eop.x08 with the exception that in this criteria the user can specify a default width that will be used when the shoulder line in plan view dgn file isn't found.

7. By default, a slope label is placed for the shoulder. If the slope label isn't needed, add a *define "~place shoulder slope labels" 0* statement to the input file to turn them off.

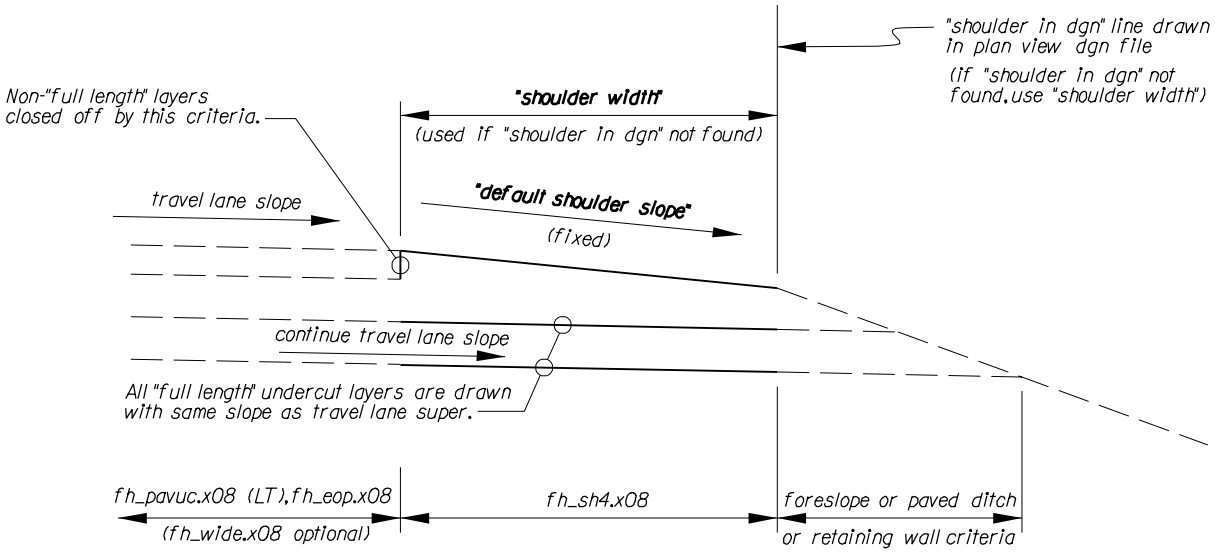
8. Text size for the shoulder slope label may be set with by adding a *define "text size" nnn* (where *nnn* is the desired text size) statement to the input file. By default the text size is set to 0.30. (The "text size" value applies to the slope labels created by all the criteria files.)

9. This criteria file is optional.

fh_sh4.x08

Draws roadway shoulder with the following properties:

- shoulder slope is fixed (8% rollover limit from travel lane to shoulder never checked)
- width of shoulder varies to match a line drawn in plan view dgn file representing the outside of the shoulder
- if the shoulder line in plan view dgn file isn't found, then the width of the shoulder defaults to a fixed value
- slope of shoulder undercut layers is parallel to travel lane slope (rather than parallel to shoulder finish grade slope)



define variables that must be assigned values in the input data file:

"shoulder width"
"default shoulder slope" (e.g., 10 = 10% down and away from centerline)
"first full length layer"

define_dgn variables that must be assigned values in the input data file:

"shoulder in dgn"

Variables that must be defined in exceptions data file:

None

Notes for fh_sh4.x08:

1. The slope of the shoulder is fixed. The 8% rollover limit from travel lane to shoulder is never checked.

2. If the "shoulder in dgn" line is found in the plan view dgn file, then widen the shoulder to that line. If "shoulder in dgn" isn't found, then the "shoulder width" is used as the default shoulder width.

Notes for fh_sh4.x08 (continued):

3. All the pavement and base course undercut layers are drawn parallel to the finish grade of the shoulder. (Contrast this fh_sh2.x08 which draws undercut layers parallel to the finish grade of the travel lane rather than the finish grade of the shoulder.)

4. The "first full length layer" variable controls whether the shoulder is a paved shoulder ("first full length layer" = 1) or a gravel shoulder ("first full length layer" = 2 or more). Normally this criteria would be used with a gravel shoulder ("first full length layer" = 2).

5. To use this criteria file to add shoulder to the roadway cross-section only in specific station ranges, set "shoulder width" to 0 and draw "shoulder in dgn" only in the areas where shoulder is wanted.

6. By default, a slope label is placed for the shoulder. If the slope label isn't needed, add a *define "~place shoulder slope labels" 0* statement to the input file to turn them off.

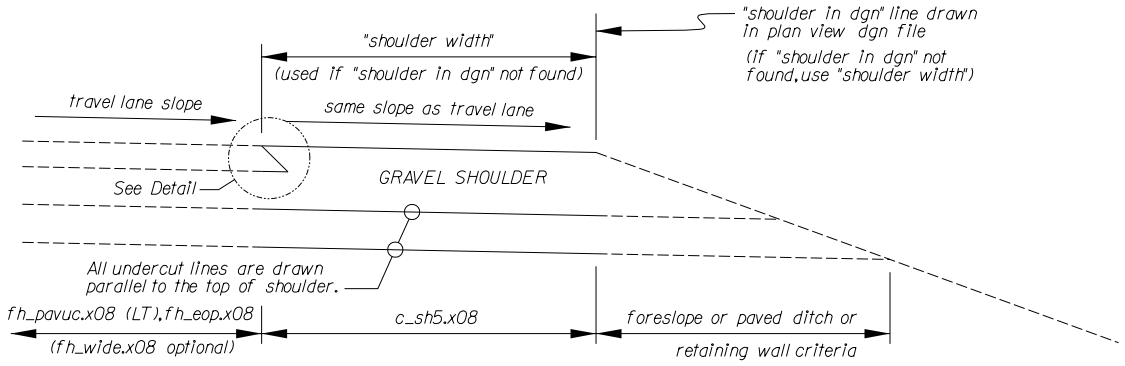
7. Text size for the shoulder slope label may be set with by adding a *define "text size" nnn* (where *nnn* is the desired text size) statement to the input file. By default the text size is set to 0.30. (The "text size" value applies to the slope labels created by all the criteria files.)

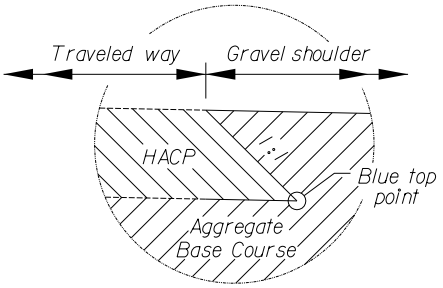
8. This criteria file is optional.

c_sh5.x08

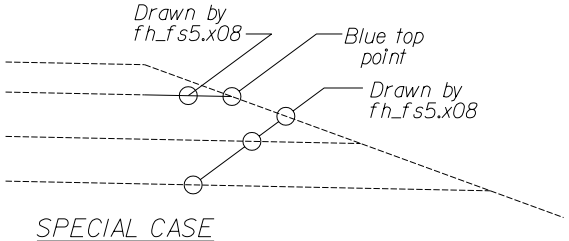
Copy of fh_sh3.x08 with revised blue top point location (see detail below).
Draws roadway shoulder with the following properties:

- shoulder is gravel, not paved
- shoulder slope is always the same as the travel lane slope
- width of shoulder varies to match a line drawn in plan view dgn file representing the outside of the shoulder
- if the shoulder line in plan view dgn file isn't found, then the width of the shoulder defaults to a fixed value
- slope of shoulder undercut layers parallel to shoulder finish grade slope (and travel lane slope)





BLUE TOP LOCATION DETAIL



SPECIAL CASE
For the special case where:
1. "shoulder in dgn" line is not found, AND
2. "shoulder width" is set to 0
the bottom of pavement layer is daylighted to the foreslope. (The foreslope criteria used MUST be fh_fs5.x08 for this to work correctly.)

define variables that must be assigned values in the input data file:

"shoulder width"
"first full length layer" (always set this variable to 2 when using this criteria)

define_dgn variables that must be assigned values in the input data file:

"shoulder in dgn"

Variables that must be defined in exceptions data file:

None

c_sh5.x08

Notes for c_sh5.x08:

1. This criteria is intended to draw only roadway templates that have gravel shoulders. If you have a paved shoulder, use one of the other shoulder criteria files.

2. This criteria is a revised version of fh_sh3.x08. It was written as per a request from Construction to locate the blue top for roadways with gravel shoulders at a 1:1 slope downward from the nominal edge of pavement. (fh_sh3.x08 locates the blue top point vertically downward from the nominal edge of pavement.

3. If the "shoulder in dgn" line isn't found and "shoulder width" is set to zero, the pavement layer is daylighted to the foreslope and the blue top point is on the foreslope. (This special case will be drawn correctly only if foreslope criteria fh_fs5.x08 is used.)

4. The slope of the shoulder is always the same as the travel lane slope.

5. If the "shoulder in dgn" line is found in the plan view dgn file, then widen the shoulder to that line. If "shoulder in dgn" isn't found, then the "shoulder width" is used as the default shoulder width.

6. All the pavement and base course undercut layers are drawn parallel to the shoulder finish grade slope (and the travel lane slope).

7. The "first full length layer" controls whether the shoulder is a paved shoulder ("first full length layer" = 1) or a gravel shoulder ("first full length layer" = 2 or more). When using this criteria, "first full length layer" should always be set to 2.

8. To use this criteria file to add shoulder to the roadway cross-section only in specific station ranges, set "shoulder width" to 0 and draw "shoulder in dgn" only in the areas where shoulder is wanted.

9. This criteria effectively does the same thing as fh_eop.x08 with the exception that in this criteria the user can specify a default width that will be used when the shoulder line in plan view dgn file isn't found.

10. By default, no slope label is placed for the shoulder. If the slope label is needed, add a define "~place shoulder slope labels" 1 statement to the input file to turn them on.

11. Text size for the shoulder slope label may be set with by adding a define "text size" nnn (where nnn is the desired text size) statement to the input file. By default the text size is set to 0.30. (The "text size" value applies to the slope labels created by all the criteria files.)

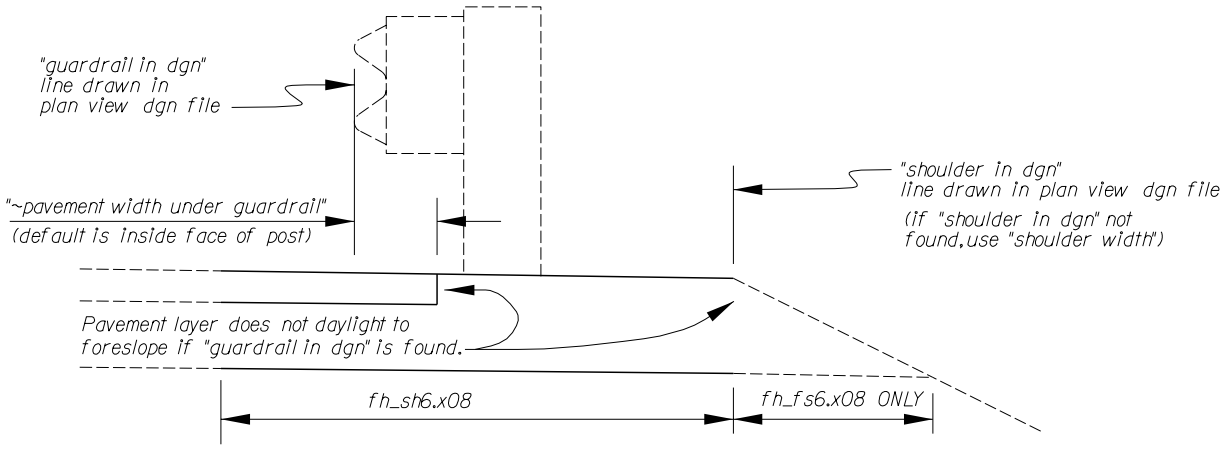
12. This criteria file is optional.

fh_sh6.x08

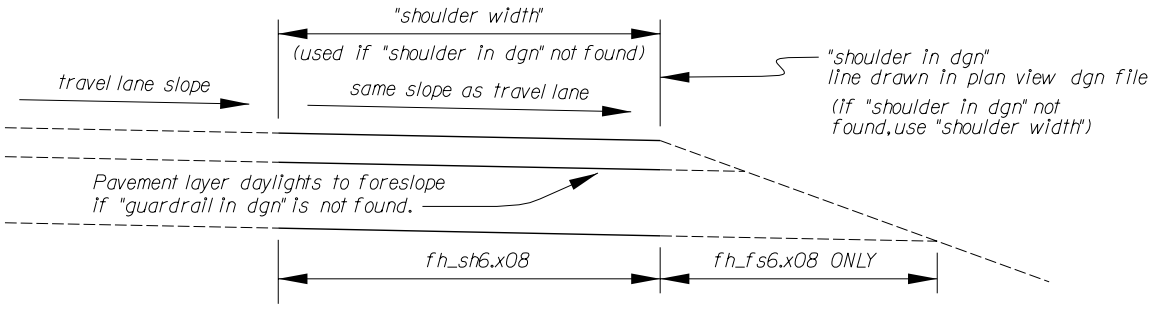
Draws roadway shoulder with the following properties:

- pavement layer is terminated at guardrail post if a "guardrail in dgn" line is found; otherwise pavement layer daylights to foreslope.
- shoulder slope is always the same as the travel lane slope
- width of shoulder varies to match a line drawn in plan view dgn file representing the outside of the shoulder
- if the shoulder line in plan view dgn file isn't found, then the width of the shoulder defaults to a fixed value
- slope of shoulder undercut layers parallel to shoulder finish grade slope (and travel lane slope)

Shoulder as drawn by fh_sh6.x08 if "guardrail in dgn" line <u>is</u> found:



Shoulder as drawn by fh_sh6.x08 if "guardrail in dgn" line is <u>not</u> found:



define variables that must be assigned values in the input data file:

"shoulder width"

define_dgn variables that must be assigned values in the input data file:

"shoulder in dgn"
"guardrail in dgn"

fh_sh6.x08

Variables that must be defined in exceptions data file:

None

Notes for fh_sh6.x08:

1. This criteria was written to address the situation where the designer wants to end the pavement layer at the inside face of the guardrail post for guardrail sections, but for non-guardrail sections wants the pavement to daylight to the foreslope. (This is a modified version of fh_sh3.x08.)

2. This shoulder criteria must be used in combination with foreslope criteria fh_fs6.x08. None of the other foreslope criteria files will work correctly with this shoulder criteria.

3. Unlike all the other shoulder criteria files, this criteria file completely ignores the "first full length layer" variable.

4. The slope of the shoulder as drawn by this criteria is always the same as the travel lane slope.

5. If the "shoulder in dgn" line is found in the plan view dgn file, then widen the shoulder to that line. If "shoulder in dgn" isn't found, then the "shoulder width" is used as the default shoulder width.

6. All the pavement and base course undercut layers are drawn parallel to the shoulder finish grade slope (and the travel lane slope).

7. To use this criteria file to add shoulder to the roadway cross-section only in specific station ranges, set "shoulder width" to 0 and draw "shoulder in dgn" only in the areas where shoulder is wanted.

8. This criteria effectively does the same thing as fh_eop.x08 with the exception that in this criteria the user can specify a default width that will be used when the shoulder line in plan view dgn file isn't found.

9. A hidden variable ("~pavement width under guardrail") in this shoulder criteria file allows the user to specify the distance from the face of the guardrail to where the pavement ends. By default this variable is set to 0.283 meters, which is the outside face of the guardrail post.

10. By default, no slope label is placed for the shoulder. If the slope label is needed, add a *define "~place shoulder slope labels" 1* statement to the input file to turn them on.

11. Text size for the shoulder slope label may be set with by adding a define *"text size" nnn* (where nnn is the desired text size) statement to the input file. By default the text size is set to 0.30. (The "text size" value applies to the slope labels created by all the criteria files.)

12. This criteria file is optional.

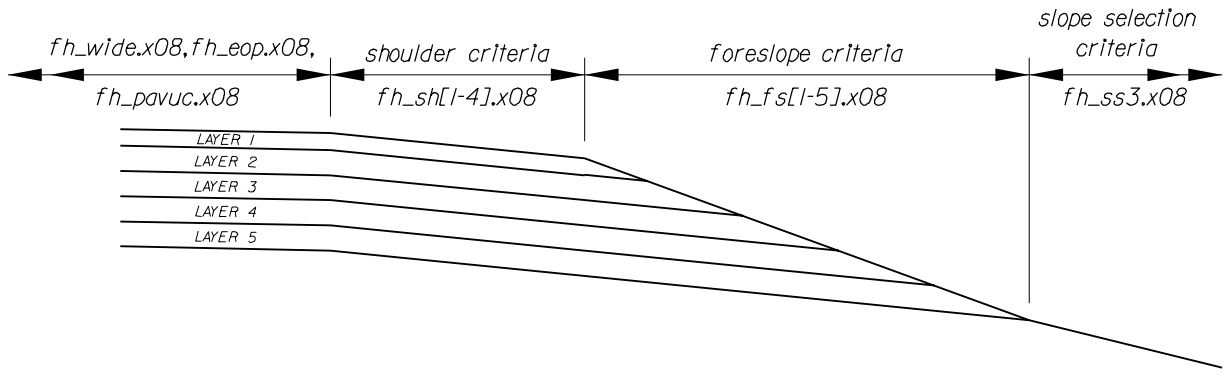
"first full length layer" Details

The purpose of the "first full length layer" variable is to allow the user the option to draw proposed cross-sections with either gravel shoulders or paved shoulders.

- If the user wants a paved shoulder, then "first full length layer" should be set to 1. (See first example below.)
- If the user wants a gravel shoulder, then "first full length layer" should be set to 2. (Or possibly more, see examples two through four below.)
- The shoulder criteria files (fh_sh[1-4].x08) close off all non-"full length layers" (i.e., all layers above the "first full length layer" with a vertical line at the inside edge of the shoulder.
- All criteria files that follow the shoulder criteria files (such as the foreslope or paved ditch criteria files) do not draw any layers above the "first full length layer".

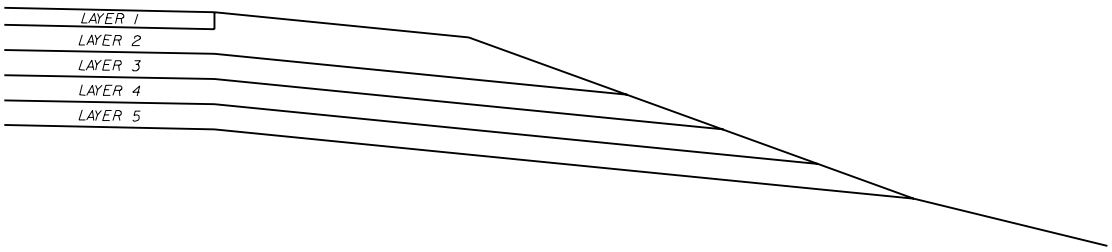
define "first full length layer" 1

All layers extend out to foreslope



define "first full length layer" 2

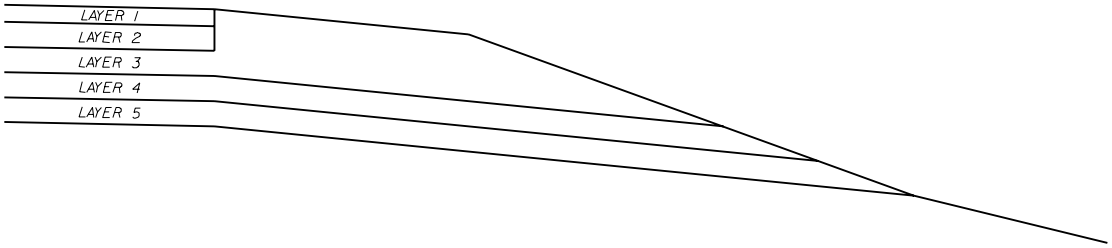
Top layer closed off at inside edge of shoulder criteria (fh_sh[1-4].x08). All other layers extend out to foreslope.



"first full length layer" Details

define "first full length layer" 3

Top two layers closed off at inside edge of shoulder criteria (fh_sh[1-4].x08). All other layers extend out to foreslope.



define "first full length layer" 4

Top three layers closed off at inside edge of shoulder criteria (fh_sh[1-4].x080. All other layers extend out to foreslope.